



TITLE

# **The Colour and Materials Matter**

*Introduction to the Colour and Materials Design in the Product Design Industry*

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# Abstract

The human environment is surrounded by colours and materials and we experience the materials and colours in our surroundings. These components influences to the human-product relationship and based on how the human experiences the products we operate within our everyday life.

As a colour and materials design professional I value crafting and detailing these elements of the product. When an object is crafted to a certain level completely, the material, colour, and surface of the object will receive emotional respond from the consumer. Mastering these elements in the product, creates a part of the product appearance and influences the human-product relationship.

This thesis studies the practice-led colour and materials design discipline in the product design industry. This thesis conducted a study from the discipline and from the practicing colour and material designers in the products design industry. The study collected insights from the field of colour and materials design.

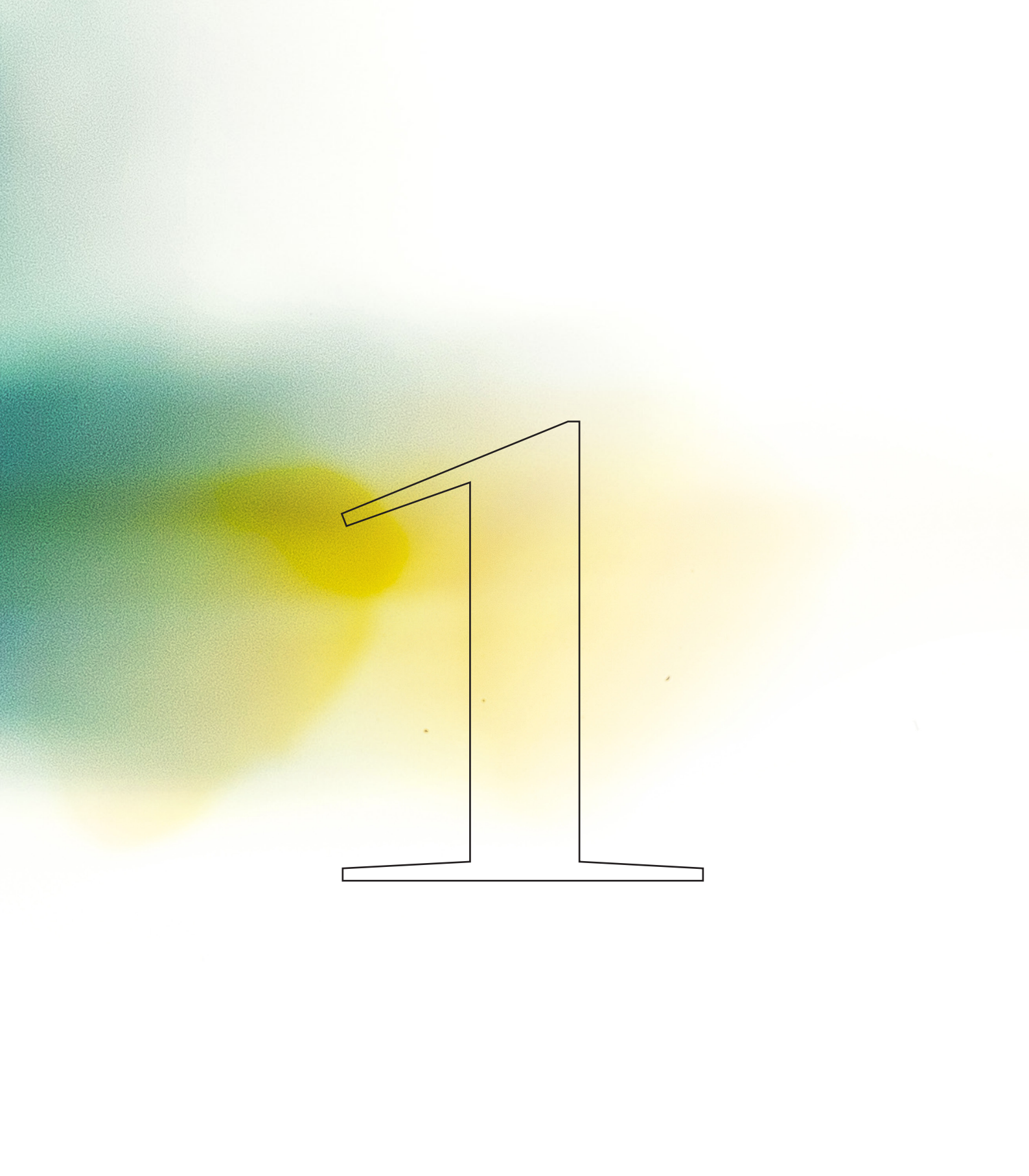
This thesis can be divided into two parts, theoretical background and the research from the field. Theoretical background briefly illustrates the theories of the human-product relationship and the colour and materials appearance. The research from the field concentrates on presenting the study from the discipline and professionals practicing in the product design industry.

## *Keywords:*

Colour and Materials Design, Colour and Materials Designer, Professionals, Discipline, Colour, Material, Human-product Relationship, Product Design Industry

# Introduction





## 1.1

# The colour and material design in context of product industry

The human environment is surrounded by colours and materials. When discussing colour or materials, these elements are difficult to divide from each other. They are closely related and impact one another. Colour and materials can create emotions in humans. The colour and materials also support a part of the product experience and the human-product relationship (Schifferstein and Hekkert 2008). We connect with these components through the products. This connection combines the *technical* and *visual* features of the product (Karana, Pedgley and Rognoli 2014).

Design can modify the human perception of the object. Materials and colours can communicate certain impression to the human. When the human senses a new object for the first time an *emotional experience* and an *aesthetic experience* are prominent features of the product. The product engages and feeds ones *senses* (Hekkert and Karana 2014, 6).

Through selected colour and materials the object communicates and creates a certain assumption from the value of the product to the user. The ambition of the colour and materials design in the product industry is to create a coherent product experience. And support the human-product interaction by implementing the colour, materials, and finishes to the object.

The colour and materials design is an established design led practice in the product design industry. This thesis focuses on studying this discipline and the practicing colour and material designers in the product design industries. These professionals are specialised designers practicing with colours and materials in the field of study.

My interest to this topic is based on my experience working as colour and materials designer in the product design industry. I gained this experience practicing in the colour and materials design team in an internationally established company. Practicing in the internal colour and materials design team, provided an opportunity to learn

and increase my own professional knowledge from the discipline. This practical knowledge from the field was the driver to conduct this investigation for this thesis.

At the present moment there are two terms in the field for describing the discipline.

CMD > Colour and Materials Design

or

CMF > Colour, Materials and Finish Design

Both of the terms are understood in the field and use of these terms depends on the company. The designers regularly practice with these two terms. In this thesis discipline is communicated with the term Colour and Materials Design.

## 1.2.

# Earlier research

The literature and earlier researches from the field of product experience, emotional design, and the literature related to the colour and materials design are creating the theoretical background for this study.

The literature for this thesis from the product experience is applied from Jordan, Norman, Sudjic, Schifferstein and Hekkert. Materials and colour experience research by Karana, Pedgley and Rognoli, Birren, and Arnkil. The colour and materials design discipline related literature applied for this thesis are from Becerra, Jongerius, Tan and Hermanns.

## 1.3

# Research questions and objectives

The objectives for this thesis is to study and understand the colour and materials design discipline as well as to study the practicing colour and material designers by collecting data from the product design industry. This thesis concentrates on the study to the established organisations and companies. The study presents an insight and aspect of practicing the discipline in established international corporation settings. The secondary aim of this thesis is to draw the understanding from the role of the colour and materials in a human-product relationship and in a product experience.

This study is unable to encompass the entire discipline and this thesis aim to present the study from the framed area. The research questions for this thesis are:

- ◇ How does the human experience the product in context of the colour and materials?
- ◇ What is the colour and materials design in the product design industry and how do the professionals practice in the discipline?







## 1.4

# Methods and data

This thesis is a research oriented thesis that aims to answer the presented research questions. The chosen research design is conducted as a descriptive study. The study is assigned to the practice through qualitative methods by studying the phenomena (Silverman 2006, 43). The primary research is conducted through the methods: auto-ethnography, specialist level interviews, and literature. The research data in this thesis is drawn from this three main methods (Silverman 2005, 121-123).

To be able to understand the role of the colour and materials in the human-product relationship, the background study is conducted through literature. The literature provided an understanding from the human perceiving the colour and materials in a product.

Regarding to Gobo (2008, 5) the method of ethnography is defined by practicing the study through observation. The ethnographic method in this thesis is implemented by auto-ethnography method and applied by the ethnographic research strategy called *participant* observation (Gobo 2008, 128). The auto-ethnography in this study is applied based on my professional experience from the field of the colour and materials design.

Based on the expertise of the auto-ethnographer in this area, the areas for the interview were mapped from the beginning of the process and divided into the four main themes as follows:

- ◇ The role and position of the discipline in the product design industry
- ◇ The colour and material designers
- ◇ The creative methods, tools, and applications of the discipline
- ◇ Future in the field of colour and materials design

The study interviewed five professionals from the area of colour and materials design. The interviews in the field were conducted as a semi-structured interview and the interviews were structured based on the themes introduced above. The questions were open ended questions presented in online interviews to the specialists (Silverman 2005, 111).

From the interviewees three of the professionals practise as senior level designers and two practise as managers in the field. The interview participants are from the automotive, footwear and consumer electronic industries. They practice in established international corporations such as Microsoft, Nike, Jaguar Land Rover, and Nio. In these interviews, the specialists provided insights and observations based on their experience from the area of the study. The participants corresponded to the survey through email without any further discussions.

Analysing the gathered qualitative data delivered the results to this study. The analysis was practiced as a content-based analysis (Silverman 2006, 159-163). I processed the data from the field by coding. I coded the data through labelling the relevant words, phrases and sections from the interviews. Based on the coding I grouped the codes and categorised them through data reduction. This categorised data I implemented under the defined main themes mentioned previously in this section.

Confirming that the conducted outcomes are general, the mapped outcomes from the interviews and the knowledge of the auto-ethnographer were examined in contrast. Evaluating the insights of the auto-ethnographer and the data from the field compiled general outcomes. Further literature supported to reflect the results in certain areas in this study. Based on the auto-ethnography, the analysed data from the interviews and the supportive literature collectively generate the results of this study (Silverman 2005, 209-212).

This thesis implements the quotations of the professionals from the interviews when presenting the outcomes of the study. The quotations support this thesis findings and allows professionals to describe the topic by their words.

The auto-ethnographer applied supportive data from the notebooks, images, and presentations from the years 2010 - 2014 when practicing in the product design industry. This data was applied as a measure for insight and support in the beginning of the process of this study. However, this data consists of confidential information from the company and the auto-ethnographer can not publish or use them as an official references.

This thesis presents and communicates the results in written form, diagrams, and supportive illustration images.





## 1.5

# The structure of the thesis

This thesis is structured in five chapters:

### CHAPTER 1.

Introducing the thesis topic, research questions, and objectives. This chapter presents the applied literature and the methods and data practiced in this thesis.

### CHAPTER 2.

Theoretical background of this study. In this chapter this thesis focuses on the product and human perception in the context of colour and materials. The study aim to understand the role of the colour and materials in the product experience. The study is conducted through literature.

### CHAPTER 3.

The thesis presents the analysed outcomes of the study and compiles the overview from the discipline and from the professionals practising in the product design industry. In this chapter the study and the outcomes are based on the auto-ethnography, interviews from the field, and supporting literature.

### CHAPTER 4.

This chapter investigates and presents the essential design elements practiced in the product design process. The chapter presents the creative methods, tools and applications that the professionals practise with in the design process. Last part of this chapter concentrates to envision the future direction of the discipline. The presented results of the study are based on the experience of the auto-ethnographer, insights and knowledge from the professionals and the supporting literature.

### CHAPTER 5.

This chapter summarises results of the study and reflects the results and the research process.

### APPENDIX 1.

This thesis includes attachments. The appendix one presents the colour and material professionals. These professionals participated and supported the study by sharing their insights practicing the discipline in the field of product industry.

### APPENDIX 2.

The appendix two presents more in-depth one of the colour and materials design creative method. The professionals developed this method from the demand for exploring the colour and surface proposition in relation to size.



# Experiencing the Product

This chapter is the background study for this thesis. The chapter tries to draw an understanding from the role of the colour and materials in the human-product relationship. The first part presents briefly the theories of human-product relationship. The second part describes how human vision and touch experiences the colour and materials of the product.

## 2.1

# The human and the product

The human-product interaction creates experiences in the user. The Functional Colourist Faber Birren (1961c, 7) describes the perception of the human as follows:

*Human perception is fascinating area of study for the simple reason that it is related to the firsthand experience of everyone. It is not something apart from life, but intimately tied in with it.*

Figure 1 visualises a model of human-product interaction based on Schifferstein and Hekkert (2008, 3). Schifferstein and Spence (2008, 148) highlights the importance, that designers should gain the knowledge about the signals which the product presents through the human senses to the human.

Schifferstein and Hekkert (2008, 5) presents that relevant studies around the human-product relationship are concentrating mainly to people experiencing the product from a subjective view. This perspective is one of the reasons why research in product experiences are applied in the discipline of psychology. This perspective combines different *sub-disciplines of psychology* such as *psychology of perception*, *cognitive psychology*, and *psychology of emotion* (Schifferstein and Hekkert 2008, 5).

Schifferstein and Hekkert (2008) presents that in these researches the following questions were asked when studying the interaction between the human and the product. Why are some products more desirable than others? What type of emotions does the object deliver? How do people use their senses when they communicate with the product? Which memories and emotions product stimulates in the human? (Schifferstein and Hekkert 2008, 5) Based on these type of questions Schifferstein and Hekkert (2008) approaches the human-product relationship in their studies.

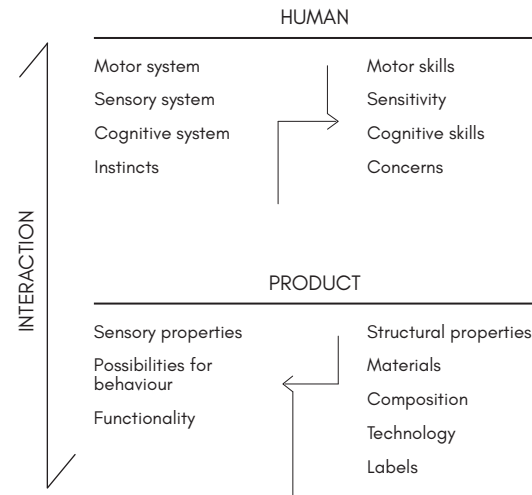


Figure 1. Model of human-product interaction by Schifferstein and Hekkert.

When one observes their surroundings they solve what they see in their surrounding (Nefs 2008, 11). This perception contains items and objects that consist of components such as form, surface, materials and colour. Through viewing and touching, these objects communicate the range of the characteristics to the human (Schifferstein and Hekkert 2008, 5). These qualities of the product create emotions in the user and these emotions support the human to function and apply decisions in their everyday surrounding (Norman 2004, 10-11).

Norman (2004) presents his theory of three levels of processing elements of the product which are related to the design in connection with emotions (Figure 2). The levels in this theory of Norman (2004) are defined as follows:

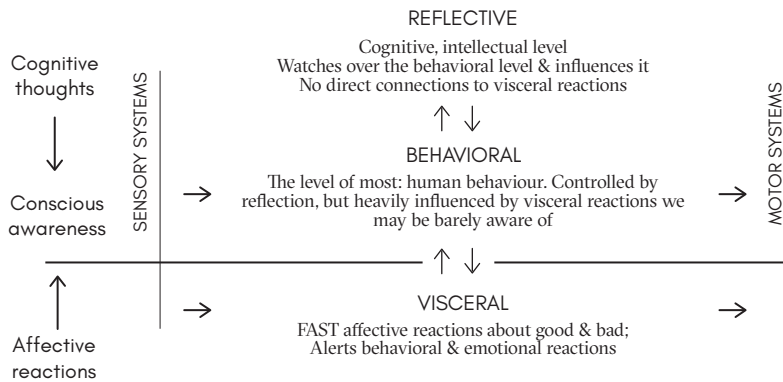


Figure 2. Three levels of design based on Norman.

VISCERAL LEVEL is fast, reactive, and most primitive. On this level user receives impression from the appearance and makes a quick conclusion whether it is good or bad.

BEHAVIORAL LEVEL is ground for *human behaviour* even though this level is not *conscious*. From design point of view on this level the brain is analysing the usability of the item and making a decision on the pleasantness of the object.

REFLECTIVE LEVEL is the *cognitive* and *intellectual* level, this level creates a self-image and memories.

According to this theory, it seems that a product exists to a human through these three levels. These levels are related to the human emotions, cognition and to the perception from the product. The humans seem to prefer to choose objects that creates positive emotions in the user. Norman (2004, 5) emphasises: *'I argue that emotional side of design may be more critical to product's success than the practical elements.'*

Hekkert and Karana (2014, 6) presents similar approach experiencing the product. When a person senses a new object for the first time, the situation creates an *emotional experience* and an *aesthetic experience*. The product experience is based on the information the human senses register, this can be conscious or unconscious. This new interaction evaluates how the product engages and feeds ones *senses* (Hekkert and Karana 2014, 6).

Referring to the literature, Hekkert and Karana (2014, 6) argues that the priority of the sensory systems of the human is to understand the world and manage in a chaotic environment. The human has created the ability to appreciate aesthetic features which communicate the functions of the product and deliver clear signals for the user (Hekkert and Karana 2014, 6). This clear communication supports the human-product interaction.

One more following approach presents theory for the human-product relationship. The book *Designing Pleasurable Products* (Jordan, 2000) presents the human-product relationship with *holistic* aspect. Jordan (2000, 4) describes the holistic approaches are considered to be *pleasure-based* approach. Jordan (2000, 13-14) presents framework for pleasure-based approach with products:

**PHYSIO-PLEASURE** - this pleasure is applied through physique. This is based on the *sensory organs* creating a tactile experience to the human through touch, taste, smell. In the product context, this approach applies for holding and touching the object as well as many other aspects.

**SOCIO-PLEASURE** - this is the enjoyment of one social relation to another. In the context of the product, social identity may be provided to the user through the product.

PSYCHO-PLEASURE - this pleasure applies *cognitive* and *emotional* reactions to the user.

IDEO-PLEASURE - this pleasure acts as a reflection of the peoples values. In context of the product, this relates to the aesthetics and symbolise the values of the user (e.g., sustainability)

Intent for this framework of Jordan (2000) is to support designer consider the product through four types of pleasure. This approach suggests to design pleasurable products thoughtfully through holistic approach and create a meaningful, usable, and pleasurable products to the human. Jordan (2000, 206) describes that consumers seem to be more aware and require a properly designed objects. These products presents values and lifestyle of the consumers.

Similar approach to the product indicating the values of the consumer presents Deyan Sudjic (2008) in his book *The Language of Things*. Sudjic (2008, 22) describes that through products: *'We use to define ourselves, to signal who we are and who we are not.'* Based on this statement Sudjic (2008, 21) explains, we create and define our personas based on the product which we then choose to consume. Consumer products communicate information from our persona, identity and values.

Based on these arguments and theories briefly presented above, this thesis assumes that the experience and the appearance of the product is relevant to the human-product relationship. Coherent features of the product creates the multi-sensory product experience to its user (Schifferstein and Spence 2008, 148). The visual and tactile elements of the product requires consideration rather than being approached as an irrelevant element in the product. In the following section, this thesis tries to draw an understanding from the colour and materials experience in the product.













## 2.2

# The appearance of the colour and materials

Colour is one of the elements creating the product appearance. Through colour the object communicates to its surroundings. Hue, saturation and brightness are the common terms when defining the colour appearance. These terms are defined in the following way

HUE - *a gradation or variety of a color; tint* (Dictionary.com, 2017)

SATURATION - *the act or process of saturating* (Dictionary.com, 2017)

BRIGHTNESS - *the quality of being bright* (Dictionary.com, 2017)

Perceptual psychologist David Katz (1884-1953) was a pioneer for creating the theory of the colour appearance (Arnkil 2013, 56). In this theory Katz defined eight expressions for the colour. Based on Arnkil (2013, 58) this classification for the eight expressions for the colour appearance of Katz contain every materials and situations where colour may appear.

These eight expressions of the colour are divided into *related* and *unrelated* theory of colour appearance (Birren 1961b, 183). Unrelated colours are the *hues of light*. They are unaffected by the environment and this type of colour does not consist of black. These unrelated colours seem to fill the space naturally in human perception.

Related colours are usually seen on the *surface* or the colour of the *object* (Birren 1961b, 183). These related colours are in relation with surroundings. The human eye locates the related colours and they consist of a black colour in their design. The related colours identify the material substances (Birren 1961b, 183).

The modes of colour appearance by Katz:

- ◇ Film colour
- ◇ Surface colour
- ◇ Volume colour
- ◇ Transparent surface colour
- ◇ Mirrored colour
- ◇ Lustre
- ◇ Luminosity
- ◇ Glow

Vision is argued to be the strongest sense of the human senses. Research suggests that visions can affect other senses of the human and modifies our thinking process (Schifferstein and Hekkert 2008). Colour and materials are fundamental features for the human. They are possibly the first elements that humans interact from birth (Schifferstein and Hekkert 2008).

Colour is first read naturally and is a strong application for communication. Colour may be applied affectively when the human signals *non-verbal* statements or messages (Tan and Hermanns, 2011). Birren (1961a, 9) approaches colour and form as a combination: "*Nothing seen by the eye is colourless. Colour is integral with form and cannot be divorced from it.*" Colour, material and form are unseparated, still colour comes first, form and materials are secondary. Referring to Birren (1961a) everything we see is coloured, human perceives colours even when we close our eyes or we are in the space of total darkness.

Psychologist have confirmed that our reaction to colour is more primitive, impulsive and much closer to emotions (Birren 1961a). Through vision colour stimulates one and creates physical reactions. This reaction influences other human senses (Birren 1961b). Senses modifies our experience from the colour, material properties and the surface tactilities. Referring to Clarkson (2008, 172) vision delivers information in pictures, motions and colour. This knowledge can be applied by humans when communicating with the object and surroundings.

Through design, designers are able to modify the human experience of the object. Referring to Sudjic (2008, 51), the selected colour and material of the object communicates and creates to the user a certain impression of the object. When materials are implemented to the product, this communicates to the consumer the value level of the product (Sudjic 2008, 51). The object produced with valued



materials is considered as a high-tier object. Whereas the product which is designed and manufactured with common materials are considered mid-tier or low-tier object. Colour and materials creates part of the appearance and identity of the objects.

Materials are one of the most fundamental factors in our physical world. Each material has a certain character and aspect that interacts to its surroundings as well material modifies the experience. The human experiences material differently based on the usage of the material. Material experiences are complicated formulas that present how humans experience the materials based on their senses. (Schifferstein and Wastiels 2014, 24) An interaction is present between the applied material and the end-user of the product (Schifferstein and Wastiels 2014, 24).

If designers can conduct the whole process including the factors of the human senses, they may be able to develop a much richer, more intelligent, and more consistent product experience to the user through materials. This approach requires a *dualist* approach to the material. The material in this approach is required to deliver the *functional* and *hedonic* needs of the user. (Schifferstein and Wastiels 2014, 24) These authors present (2014) finding from the material development based on this dualist approach. The new material development and applications require a *multidisciplinary* work mode with a selection of professionalism to succeed in the field of design.







## 2.2.1 Touch and tactility

The human can *perceive* colour and form as being part of the *physical* world. However, recent studies show that material and *materiality* can only be learned by human touch (Schifferstein and Wastiels 2014, 24-28). We experience and learn by touching the object and perceiving the characters of the materials (Schifferstein and Hekkert 2008).

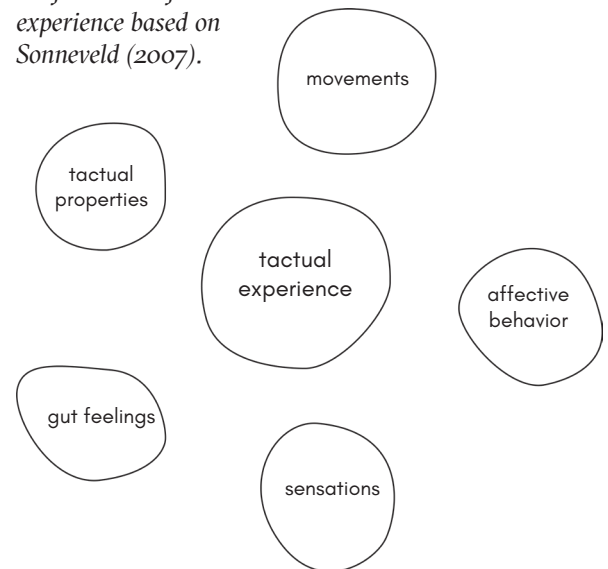
According to Schifferstein and Wastiels (2014, 28) they argue touch is less researched compared to vision from the *sensory modalities*. With touch the human may automatically collect a range of information from the material. Information such as weight, texture, and temperature. If we approach touch and tactility from this perspective the human is able to learn more about materials and man-made objects (Sonneveld and Schifferstein 2008). This supports the earlier theory that colour is the first read for the human from the visual elements in the product. Materials are the secondary read and require closer review and in-depth understanding from the user.

Tactual qualities may affect the user *self-experience* of sensing the product by touch. This means, if a material feels cold the human might start to feel cold. Texture and material interact with each other in relation to the object as well as to the surface structure. Referring to Sonneveld and Schifferstein (2008), exploring the fine surface texture of the object is only possible by touch.

Touch and *tactual* experiences are basic parts of our everyday life. Sonneveld and Schifferstein (2008, 49) presents the four tactual assets and the relation of these assets:

- ◇ *The substance*, materials of the object.  
*Hardness, elasticity, plasticity, temperature, and weight.*
- ◇ *The surface* of the product, texture and patterns.
- ◇ *The structure*, form of the object.
- ◇ *The moving parts*, the relation between moving parts in the same object.

Figure 3. Overview of the five areas of tactual experience based on Sonneveld (2007).



The human environment is surrounded by objects and they sense items constantly. However, it is exceptional that the user will present the analysis and observation from the tactual feel of the object (Sonneveld and Schifferstein 2008). Based on this observation Sonneveld (2007) created a method called *Tactual Experience Guide* (Figure 3.) for designers as well as for users. This framework is developed to support designers and user to verbalise the tactual experiences when *interacting* with the object.

One of the key factors for this guide was the ambition to understand the *aesthetic aspects* of the *tactual experiences* (Sonneveld and Schifferstein 2008, 42). These aspects are intended to create an enjoyable experience to touch and contrarily delivers the information from the material of the product which cause an unenjoyable experience to touch (Sonneveld and Schifferstein 2008, 42).

Experience is subjective and makes it challenging to deliver direct conclusions to the human and at the same time it is intriguing that every human being has their own understanding and perception from the world of colour and materials.

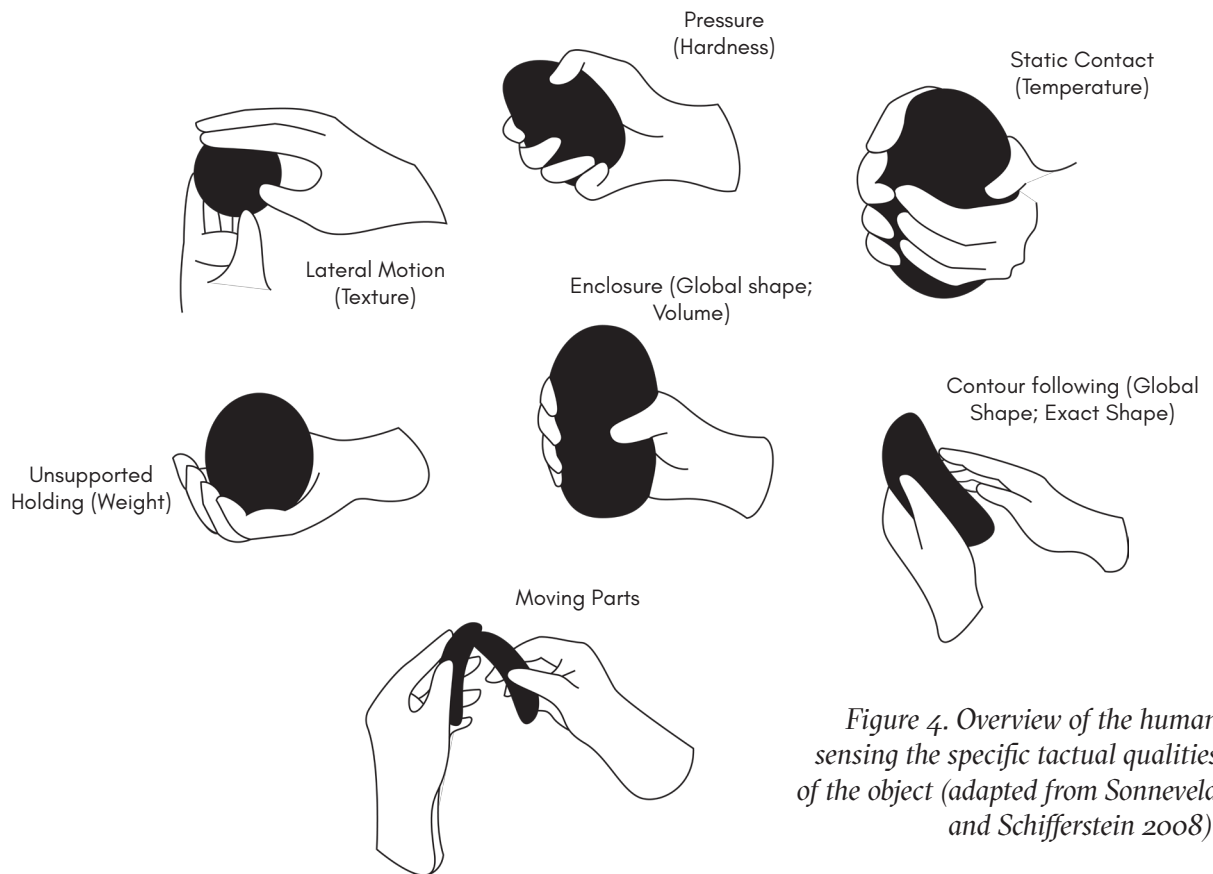


Figure 4. Overview of the human sensing the specific tactual qualities of the object (adapted from Sonneveld and Schifferstein 2008).















# Colour and Materials Design

This chapter introduces the colour and materials design discipline and the colour and material design professionals from the product design industry.





## 3.1

# The role of the colour and materials design in the product industry

The colour and materials design is an independent part of the industrial design discipline and practices throughout the product design industries. Author Liliana Becerra (2016) defines, the discipline is rather young, however, it is established independent design-practice.

The discipline performs by specifying the colour, materials, and the surface finish to the product or to the range of products. The discipline focuses through colour and materials mastering the visual beauty, emotional features, and functional properties of the object (Becerra 2016, 12). The combination of these elements creates a part of the brand and the product experience to the consumers. Ambition of the discipline is to create a coherent product experience through colour, materials, and finishes. The balance between these elements support creating the pleasurable human-product relationship as an end-result. This develops memories and emotional connections in the end-user of the products (Becerra 2016, 20).

Typically design-led organisations operate with an internal colour and materials design team. This team practices in collaboration with other departments of the company. Referring to the professionals, certain variations might

occur based on the type of organisation, however, the main principles and core practices are applied throughout the product industries. According to the insight from the design professionals and Becerra (2016), it seems the discipline is the fundamental part of the product design process in specific product industries. The discipline is practiced in product design industries such as automotive, consumer electronics, footwear, packaging, and apparel.

The study draws an interpretation from the field, the professionals operate with multitude components in parallel with the process. The professionals implement design solutions to the design strategy and portfolio whilst supporting the creative research and development, they also practice in the product design programmes. The professionals collect a large amount of information related to the product during the product design process. The designers impact the product appearance by selecting from a range of applications, these selections control different attributes and characters related to the object. Colour and material professionals decide how these components are implemented and presented in the final product (College for Creative Studies, 2017). One of the professionals described the role of the discipline as follows:

*Colour and material design can drive innovation and create coherent and strong brand look and feel. Good Colour and Material Design and strategy can drive quality and save money at the same time.*

Referring to Becerra (2016, 13), the colour and materials design process provides a valuable differentiation for companies. The discipline supports the value proposition as well as the market positioning of the product.

However, the finding of the study interprets the challenge which may occur occasionally in the field. Some of the companies may consider the colour and materials as an additional element for the product. These organisations include this element until in the final part of the design process. This comment from the professional illustrates the situation:

*With a better overall knowledge what the CMF is and the opportunities it is creating within the overall design process it could become a very powerful area. There is still some educational work to be done to make them understand what a fundamental resource colour and material design is for innovation.*

When this misconception occurs in the organisation, the discipline is unable to function to its full potential. Conversely, according to the interview of Alex Horisberger (Openshaw 2015, 170) from BASF Designfabrik. Horisberger describes noticing in their studio that the design process of the organisations is slowly turning. The materials have evolved to become the new direction for inspiration, solution, and the starting point for the entire product design process.



"Colour and material design can drive innovation and create coherent and strong brand look and feel. Good Colour and Material Design and strategy can drive quality and save money at the same time."









This study found that the professionals highlighted a number of companies from the field who execute this discipline transforming them into a design forward organisation. These mentioned companies were Nike, Adidas, and Apple. It seems in these organisations the role of the discipline may be fundamental from the beginning of the design process. Also the colour and material designers are part of the process from the beginning of the product design development. This approach is assumed to be one of their key assets for thriving in their business area. One of the interviewees described the situation as follows:

*When an organization understands the importance of design, colour and materials design is able to flourish and help make products that connect with people. Companies like Nike and Apple are great examples of how design forward companies succeed over others.*

The survey for the study indicated that design-led companies from the examples mentioned previously, invests in their research and materials innovation development. These organisations implement the colour and materials innovation to their high-level business strategy. Based on the insight of the professionals, the materials technologies and the innovation development requires a timeline approximately between two to ten years. By applying both short-term and long-term materials research companies can create various new material technologies. These technologies include innovations, the colour and materials design solutions and these will be implemented to the roadmap and to the product portfolio of the companies.

The fundamental part of the materials development process is the material experimentations, trials, and error (Becerra 2016, 5). Mastering and developing the colour and materials requires a long-term commitment from the organisations. Insight from the professionals, study indicate that design forward organisations understand the importance of the innovation and the value of development. They commit resources and invest into their design approach and to their design strategy. The study indicates that the colour and materials are a matter of strategy if the company approves invest in design.

“When an organization understands the importance of design, colour and materials design is able to flourish and help make products that connect with people.”





## 3.2

# The colour and material professionals

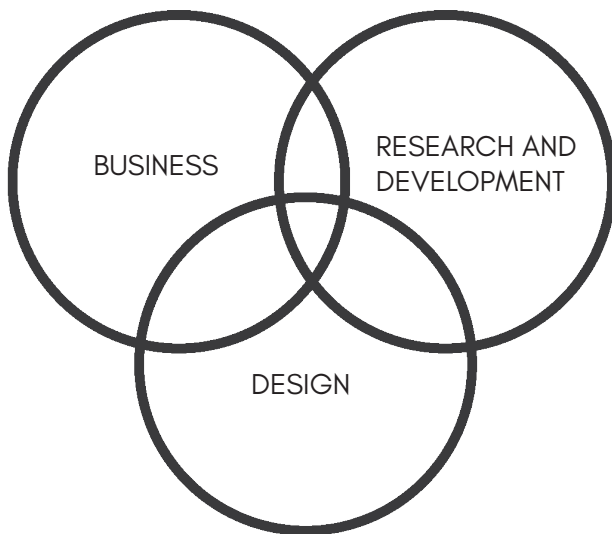
One of the themes from the survey focused on colour and material professionals. These interviews concentrated on their background and the skills that are requested when practicing in the field. The results of the survey support the indication as follows, it is likely exceptional to become a colour and materials designer through a certain career path or educational programme. The backgrounds of the professionals vary based on the individual.

The colour and material designers possess a diverse portfolio and background from the field of design. They are driven by the interest to learn about the materials and colour. Based on the survey it is common that designers enter the industry with the background of design such as fashion, textiles, graphics, industrial or product design disciplines. The indication is supported by Becerra (2016) who presents a similar statement in her literature. Appendix one briefly presents six professionals individually, their careers and their educational backgrounds to showcase these findings.

Based on the study, the colour and material designers combines both a creative and functional design approach. The discipline is artistic and strategic thinking that has merged to the practical hands-on approach. Colour and material designers perform in collaboration and support the product designers. By applying this designers achieve a balance between the *visual appearance* and the *technical properties* of the product with functional features.

The internal design teams practice in the horizontal mode within the companies. Working in this position requires ability to work in diverse environments as well as willingness to co-operate with a diverse range of professionals. The following information is visualised based on the study. The following list presents an overview of the colour and material designers practice within a group of specialists internally and externally in the product design process (*Figure 5.*).

Figure 5. Overview of the colour and material designer practice within a group of specialists internally and externally in the product design process.



#### Design

- ◇ Industrial design team
- ◇ Surface designer
- ◇ User experience designer
- ◇ Package designer
- ◇ Visual designer
- ◇ Strategy and portfolio planner
- ◇ Forward design team
- ◇ Trend forecasting team

#### Research and Development

- ◇ Material engineer / Specialist / Developer
- ◇ Sourcing
- ◇ Visual quality engineer
- ◇ Mechanical engineer

#### Business

- ◇ Branding
- ◇ Portfolio planner
- ◇ Product manager
- ◇ Merchandiser
- ◇ Sales
- ◇ Marketing

#### Supporting external partners

- ◇ Suppliers and vendors
- ◇ Model maker
- ◇ Trend forecasting services







## 3.3

# The skills of the colour and materials designer

This study collected data from the professionals about their performance areas and outlined the findings. The senior level designers described performing regularly in the areas as follows:

- ◇ Strategy and direction planning
- ◇ Concept design
- ◇ Product programme design
- ◇ Colour and materials studies
- ◇ Innovation and development of the colour and materials
- ◇ User experience explorations
- ◇ Lifestyle explorations
- ◇ Future and trend forecasts

The result of the study summarises the skills that the professionals are required to possess practicing in these areas. The findings from the study indicate that core interests of the designers are curiosity to trial and error, as well as the ability to learn by execution. These core interests are the fundamental part of the colour and materials design process. This study indicates that a multi-disciplinary background appears to be as a strength for the designers. The ability to understand the field which may not be considered traditionally close to the design is another key asset for the professionals. One of the designers commented as follows:

*Colour and Materials designers are collaborative personalities and hybrid thinkers who are able to think flexibly and strategically within their own design discipline as well as across other disciplines.*

This comment supports the finding presented in previous chapter that the discipline practices in horizontal position in the organisations.

Following section present expertise of professionals in a more detailed in-depth aspect than Becerra (2016)

presents in her book. This thesis documents two distinct themes, *intellectual qualities* and *tangible qualities*. These competencies appear to be essential to perform as accountable colour and materials designer in the product design industry.

The intellectual qualities are defined as follows:

- ◇ Ability to combine a creative and practical mindset
- ◇ Knowledge from the materials and colours experience
- ◇ Capability and willingness to collaborate
- ◇ Possess excellent communication skills
- ◇ Capability to connect different disciplines into one unique experience
- ◇ Understand the portfolio logic and the strategy thinking

The tangible qualities are specified as follows:

- ◇ Knowledge from the materials and colours from the areas such as:
  - manufacturing process
  - functional properties
  - physical behaviour and limitations
  - technology
  - proposition
  - light and reflection
- ◇ Understand visual aesthetic
- ◇ Perform in visual communication
- ◇ Storytelling and create the narratives
- ◇ Executing trend / consumer / market research
- ◇ Knowledge of the user experience
- ◇ Knowledge of the human senses and emotional attributes

These skills colour and material designers applies in the colour and materials design creation process. Overview of the creation process is presented in the chapter four.

“Colour and Materials designers are collaborative personalities and hybrid thinkers.”

Further the study indicates two opposite future opportunities and directions for the colour and material professionals to evolve in their practicing role. The results assume either designers concentrate to develop and practice the knowledge to the *specialist level* or evolves becoming a *skilful hybrid designer practicing across the disciplines*. In the study, the professionals described these opposite directions as follows:

*I strongly believe in the idea that in the future there will be a lot more hybrid designers needed, people who are feeling comfortable at the intersection of several disciplines and who will work a lot more cross discipline.*

In contrast, another professional commented the evolution in the following way:

*I see the role of color and materials becoming much more specialized in the future. In previous roles when I was designing Colors, Materials, Graphics and Finishes, it was hard to fully dive deeper into any one of those and create something truly new. Now, that my focus is primarily on materials, I've designed materials that would have never been possible before, the same goes for color design.*

The results provided a few additional desired skills that seem to be necessary for practicing in the field of colour and materials design in the future. The list subsequently suggest the demand of these expertise may be increasingly growing in the future:

- ◇ Ability and competence for holistic design approach
- ◇ Practicing strategic thinking
- ◇ Managing the portfolio
- ◇ Capability perspective to understand a big-picture through colour and materials

Based on the survey from the field this study indicates that colour and materials professionals are requested in the future develop these strategic and experience related competencies when practicing the discipline in the product design industry.









# Creation of the Colour and Materials Design

This chapter introduces the colour and materials design creation. The first part of the chapter presents an overview of the essential elements which creates the foundation for the colour and materials design process. The second part introduces the creative design methods, tools, and applications. The third part concentrates to envision the future direction of the discipline.

4

## 4.1

# The essential elements

The selection of the essential building blocks creates the colour and materials design process. Specific content of the elements varies depending on the companies and their design processes. However, regarding to the study, every element demands a certain amount of contribution and investment from the companies. A certain core and similarity with the structure of these elements remain when working with colour and materials design in the product design context.

Based on the study, the discipline offers opportunities for the professional to develop and evolve in their profession. Referring to Becerra (2016, 14), a competent designer covers the complete creation process. However, a designer can possess a distinct strength in a particular area. This may provide the opportunity to master and practice in the specific area more than the other areas (Becerra 2016, 14). Based on the study and the literature, this thesis presents the essential creation elements as follows:

### VISION WORK

By vision work, the design team creates the future roadmap that impacts their outcomes with the other departments in the organisation. Idealistically vision work is produced in collaboration with design, research and development, and business. Trend research, future studies, and innovation processes are part of this design phase.

### STRATEGY

Vision work sets the base for the strategy. This element defines the principles and the goals for the design approach, the design language, and the strategic product offering as well as the colour and materials ideations. Through strategy the team manages the overall scheme as well as the product portfolio. The long-term strategy predicts the delivery for the next three to five years. The long-term strategy frequently practices in parallel with the short-term strategy which targets to deliver outcomes for the next two to three years. The strategy evolves and sets the direction for the forward development of the organisation.

### CREATIVE CONCEPTING

Creative concepting genuinely focuses to develop new thinking and advanced plans for the concepts. Creative concepting in the design process opens possibilities for the

designer to explore the concept development as long as the approach is not decided. Creative concepting challenges the current approach by evaluating the options of the concept continuation. The study findings indicate that the professionals prefer the creative concepting the most from the design creation elements. Designer describes this element in the study as follows:

*As Colour and Materials designers, we are able to explore and 'dream' a lot at this stage as it's a very open phase. Although we have to narrow down and be more realistic in later phase, it's always worth pushing the boundaries and challenging ourselves.*

One of the designers presented the phase as follows:

*You envision and develop new thinking and methods around societal and cultural change, trend research, futures studies and innovation processes to uncover new ideas and possibilities.*

## STORYTELLING

In this design phase designers create and visualise the narrative of the products (Becerra 2016, 41). The storytelling creation focuses on the direction in which the products proceed with the company. The storytelling communicates visually and verbally the targeted lifestyle as well as the colour and materials narrative of the products. The storytelling is a tool for companies in the industry to communicate internally in the organisation as well as externally with the partners and the consumers.

## PALETTE DEVELOPMENT

The palette development creates the colour palette narrative and the palette evolution. The colour and materials strategy provides the direction for the palette development. These outcomes of the development are a tangible collection of samples. The process proceeds simultaneously with the strategy level design decisions related to the colour, materials, and finishes. The palette development is a time consuming process that achieves the good quality, high performance, the production feasible colour and material samples.

## ROADMAP

The colour and materials roadmap is a combination of strategic work, research and development as well as the palette planning. The flow of the colour and materials along with the lifecycle analysis, are part of the planning phase of

the roadmap. These components affect and feed each other and support the chosen direction.

## RESEARCH AND DEVELOPMENT

The research and development focuses on identifying and exploring possible future outcomes. The exploration of the research and development may include innovation processes, new concepts, and opportunities in the field of material studies. After the exploration the company defines a short-term and a long-term research and development projects which will continue. The outcomes of the research and development delivers the fundamental part of the colour and materials strategic approach. These outcomes are part of the roadmap.

Research and development is essential for the design-led approach. The research phase requires a range of technology and effort from the material specialist and the designer to be able to proceed with the materials development. The material specialists and the designers concentrate to collaborate with the suppliers and with the raw material suppliers. The development process contains frequent trial rounds and iterations prior to the approval of the final outcomes.

## PRODUCT PROGRAMME

The product programme combines all of the phases from the design process in the final products. In the product programme process the designers practice with all of these components described in this section. The designers approach these components individually on a smaller scale based on the programme phase.





## 4.2

# The realisation

Regarding to the study designers apply a selection of creative methods, tools, and applications in order to deliver the colour and materials design creation process. Most of the tools are internally applied in the company, although certain services provide external consulting companies and the suppliers.

The terms method, tool and application in this thesis are defined as follows:

*METHOD - a procedure, technique, or way of doing something*  
(Dictionary.com, 2017).

*TOOL - any instrument of manual operation & anything used as a means of accomplishing a task or purpose*  
(Dictionary.com, 2017).

*APPLICATION - the act of putting to a special use or purpose*  
(Dictionary.com, 2017).

## 4.2.1

### The creative methods

In the study the professionals shared practicing the discipline with the selection of creative methods as follows:

- ◇ Brainstorming, creative workshopping, and dream shopping.

With this method designers identify and define the opportunity spaces for creating meaningful experiences through the design by physical and digital offerings.

- ◇ Observing and photographing

- ◇ Personas, user interviews, and user testing.

This designer described the method in the following way: *‘When I give what I’ve created to the athlete and get their reactions, that’s when I see if I succeeded in my goal or need to try again.’*

- ◇ Research, explorative model making, prototyping, and hands-on exploration

With these methods designers gain support to proceed in the realisation process by delivering the first creative insights. The professionals evaluate the possible potential of the new concept. These methods create a rapid exploration for the discovery of colour, material, and finishes. This provides better understanding of the colour, materials and surface qualities and exposes possible material limitations.

Explorations give information of the scale, composition, proportion as well as detail level proportion. Furthermore the tangible models and samples support the designer to communicate with the suppliers, material specialist, and artist or craft maker. The designer described these methods as follows:

*Samples, stuff, bits and pieces of things. I hoard what I call “inspirational material” but what most people would consider trash. When you want to create that perfect feel, shine, effect or the way that textile should wrinkle, this library of miscellaneous objects*

*“I hoard what I call **inspirational material** but what most people would consider trash.”*

“When I give what I’ve created to the athlete and get their reactions, that’s when I see if I succeeded in my goal or need to try again.”

*comes in handy. To create something new you have to think out of box – whether it means drying white bread pieces to illustrate “just the right amount of porousness” for a foam company.*

The Designer and the Colour Author, Hella Jongerius (2016) presents in her book the exploration method for the colour system development she created with her team. Jongerius describes her studies:

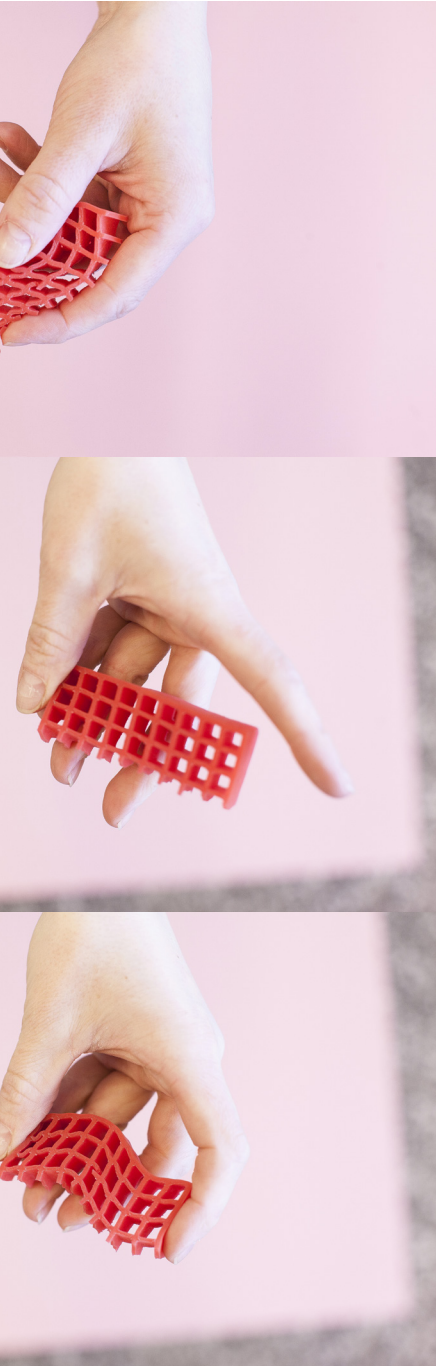
*My studies on colours are triggered by their effects on volumes, shapes, hard or soft edges, smooth or tactile surfaces, shadows. This search is endless study of colour’s nature, which is strongly related to each individual person’s perception. I try to develop my colour knowledge with daily object in my mind.*

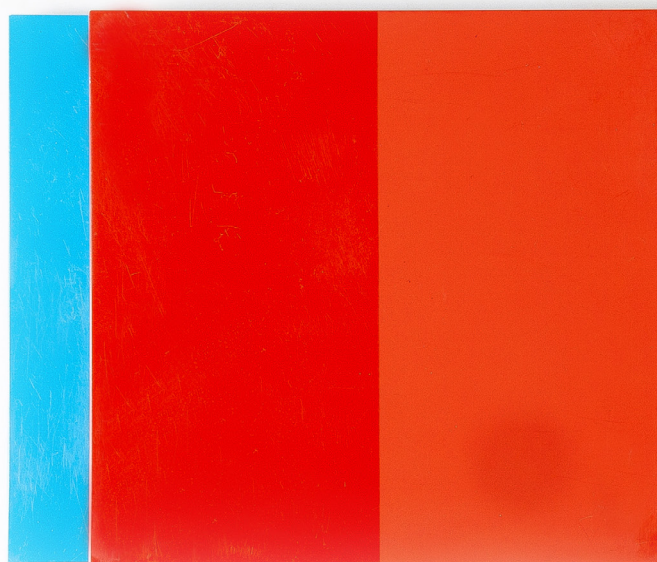
According to Jongerius (2016, 26, 32) the creation as well as the development of the method is purely experimental research. These outcomes from the study creates an end-result of colour design tools, actual colour combinations, palettes, and colour effects. Her experimental studies concentrate on the various aspects of the colour applied to the everyday objects (2016, 26, 32).

It is usual that professionals create themselves the specific methods which serve their requirements when practicing with colour and materials. Appendix two presents an example of the colour and materials design creative method. The creation as well as the development of the presented method was based on the demand from the designers in the colour and surface proportion explorations.













## 4.2.2

# The tools and applications

The findings of the study present the tools and applications that designers practice with during the product design process. This study results indicate the range of tools and applications as follow:

- ◇ Images
- ◇ Videos
- ◇ Design software
- ◇ Palette
- ◇ Moodboards
- ◇ Colour, materials and texture sample boards
- ◇ Magazines and literature
- ◇ Design websites
- ◇ Hand making tools
- ◇ Colour systems (e.g., Pantone, NCS, RAL)
- ◇ Exploration and appearance models

### ◇ Colour and materials libraries

The internal colour and materials design team at the companies usually have their own internal colour and materials library. This library is used by the designers to work, browse, and archive the colour and materials studies. The inspirational samples, the manufactured colour and material pieces, and the latest developments from the suppliers are archived to the library. By archiving the data and the samples, the company secures that certain data is quickly available as a reference during the colour and materials creation process.

The external material consulting companies provide their services and access to their material libraries. Consultants (e.g., Material Connexion, BASF Designfabrik) provides their wide selection of tangible colour and materials examples for designer to experience the different material qualities and visual features (Tan and Hermanns, 2011, 98-99).

### ◇ Trend forecasting services

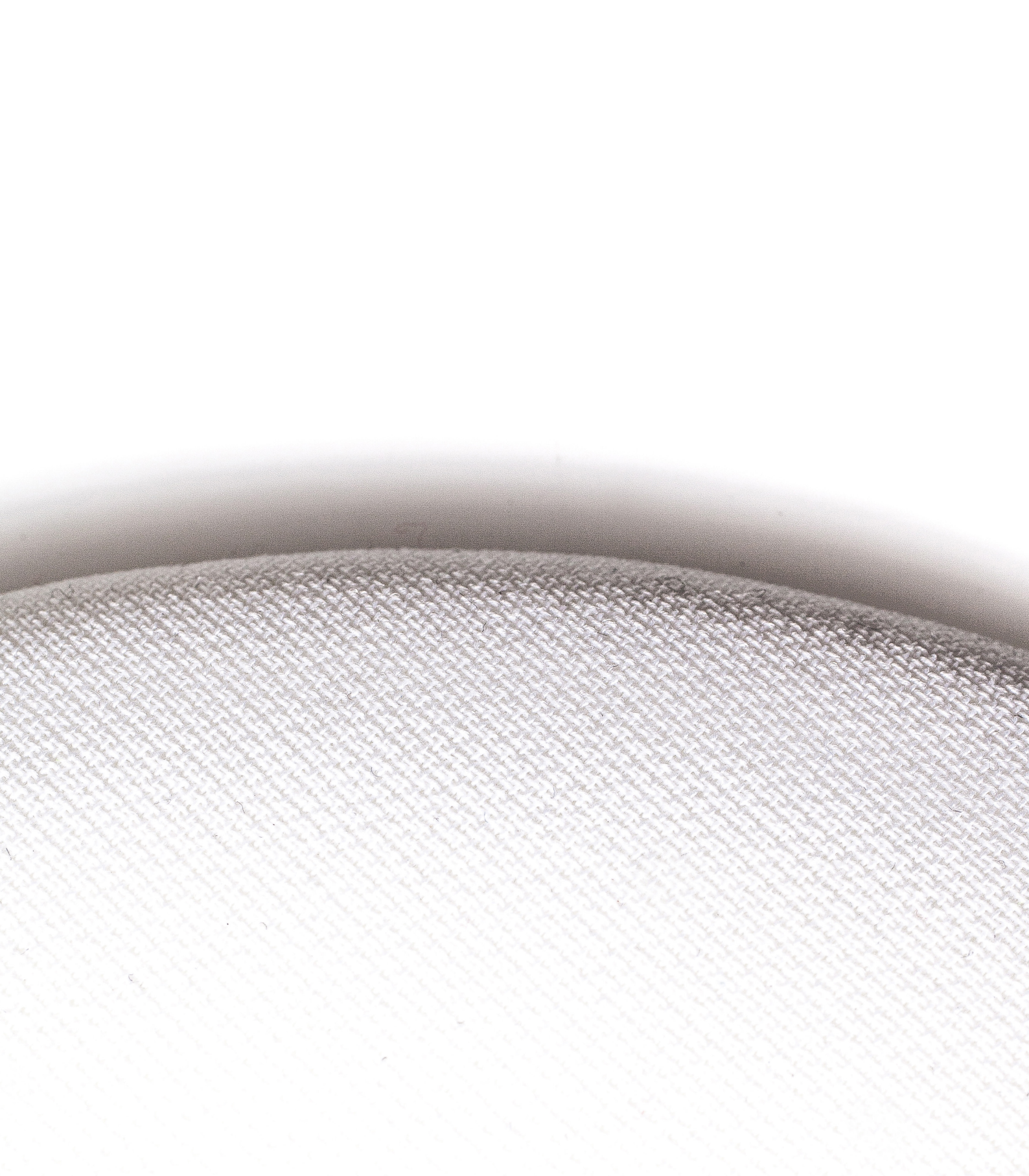
A consultancy based service shares their knowledge of future insights. The research and analysed data is offered through online platforms (e.g., WGSN, The Future Laboratory). They publish books, future research reports as well as they offer lectures and seminars for professionals to gather inspiration, insight, and knowledge for future direction (Thefuturelaboratory.com, 2017).















## 4.3

# The future of the colour and materials design

In the previous chapters two and three as well as in the sections 4.1. and 4.2 above, the thesis focused mostly for the present situation in the field of colour and materials design. In the final part of the survey questions, the professionals were interviewed and asked to focus on the future of the discipline. On the basis of the literature and the interviews this thesis presents two themes for future evolution.

### 4.3.1

## The synthesis of material and immaterial

According to the study, knowledge from human senses and experience in context with colour and materials will likely impact the discipline. Additionally the knowledge from human senses and experience will modify the role of the colour and materials design. The professional described this assumption for future direction in the following way:

*Area what I dare to claim which will be as impactful as the sustainability is and will be much bigger is understanding the emotional, sensorial and product experience.*

Supporting this assumption Laughlin and Howes (2014, 48), presents the sensoaesthetic properties of materials. This new theory will offer to the diverse range of professionals the knowledge of the physical and sensorial properties of the product. In this area of research is still relatively new in the field of materials science (Laughlin and Howes 2014, 48). However, in the future in the product design industry, it seem to be valuable data for the professionals practicing in the field of product design.

The study indicated, the combination of the physical and digital world will likely impact the colour and materials design. The transfer between the tangible materials and immaterial experience will be co-existing. This co-existence will likely request the designers to practice simultaneously in the physical and digital space. Subsequently this will likely deliver the seamless experience as an end result to the users.

The perception and extension of the materials will change in the digital space. In the future, technology provides new extensions to our everyday reality (Openshaw 2015, 159). This view was raised as well in the survey and was echoed with the interview respondents. One of the designers described the theme as follows:

*As new technologies, innovations and embedded smartness roll into market also the integration of colour and material design and user experience has become increasingly important. For example "smart"*

“Area what I dare to claim which will be as impactful as the sustainability is and will be much bigger is understanding the emotional, sensorial and product experience.”

*features implemented on a material can easily become gimmicky or feel forced instead of creating natural and human feel interactions. I see the next big step being colour and material design moving closer to user experience.*

This thesis presents the assumption the synthesis of material and immaterial experience is the direction where the discipline will evolve. According to the study the results indicated the following assumptions. The role of the multi-sensorial and emotional experiences in the physical and digital environment seem to become part of the design creation process. This direction will request from the designers the knowledge from the holistic product experience in the context of colour and materials.

Sonneveld and Schifferstein (2008) argues that the design education should offer to update the education for students in the area of the product experience. The emotional understanding, multi-sensorial experiences, and the changing circumstances in the world sets the urge to designers to refresh their offer around this area. This theory emphasises the capability of the designer to understand the process of the human-product interaction experiences (Schifferstein and Hekkert 2008). If this design education was offered to the designers they would have the knowledge to implement the factors listed above. Sonneveld and Schifferstein (2008) comments, through these factors designers will provide: *'More pleasurable and memorable multi-sensory product interactions.'*

Establishing knowledge from the presented assumptions in the previous sections, this thesis suggests that implementing the data to the design process in a company may consume time. The research from the colour and materials experience will possibly provide the ability for the professionals to create greater and more meaningful science-based and demand-focused products.





### 4.3.2

## The sustainable colour and materials

This study indicates that the second area for the future direction will be the materials and innovation development. Already the thriving product design companies are performing successfully in this area as fundamental component in their product design process. These companies were mentioned in the chapter 3.1. It seems that the future of materials innovation will greatly impact the industry. This impact will create inspiration and drive the product design processes in the field of product design.

In the area of colour and materials innovation and technology developments, signals are predicting that the direction of material innovations will create new sustainable materials for the industry. With the development of new sustainable materials and the creation of a new sustainable material manufacturing processes are increasing. The expertise for producing these sustainable colour and material innovations are expected to increase in demand (Openshaw 2015, 159). The chief sustainability officer from Kering, Marie-Claire Daveu describes in the Frame magazine (Openshaw 2015, 159) as follows:

*The digital era is the trigger. Customers have an unprecedented level of knowledge at their fingertip and are more and more exposed to the story behind materials, behind products.*

Openshaw (2015, 159-161) describes in the article that the digital movement encourages product design industries to develop and react to the concerns of the aware young consumers. The sustainable material innovations and the

transparent supply chains will assure that the product design companies may succeed in the future (Openshaw 2015, 159-161).

In the field of colour and materials design these are known factors and in the survey one of the professionals described the topic as follows:

*We are living in an age of mental and aesthetic exhaustion, the tendency towards essential design is getting stronger all the time and people are placing more value on quality and durability. Buzzwords such as “emotionally sustainable” and “economically viable” are gaining in significance.*

However, the sustainability of the colour and materials still require further research and development to become an effective innovation in the organisations. Regarding to the survey one the professionals commented on the complexity of the sustainability in the product design:

*As a colour and materials designer one should always be aware of what is happening in the field of sustainable materials and technologies and try to implement more sustainable choice when it comes available. However one should also be aware of how much energy, water or other related resources are used in manufacturing the “sustainable” material – all in all it is an complicated area that has its own specialists. From a single designers view it can be even more impactful environmentally to design in a smart way utilizing one material development investment in multiple products and throughout several years. Material-led design approach also often means better yield and less scrap.*

Based on the study this growing trend seems to suggest that in the future the practicing professionals in the field of design will require environmental and social awareness. These professionals will need the ability to gain the knowledge of the sustainable product life cycle. The expertise of the raw-material processes, material flows, and exploring the waste material innovation opportunities will create part of the product design process in the future.

The lifecycle analysis of the materials and the sustainable manufacturing processes are the foundation of the sustainable colour and materials design process. Implementing these elements with awareness to the product design process will enable professionals to impact the entire design approach (Becerra 2016, 112).

Similarly, the authors of the book *Tools for the Design Revolution* (Gruendl et al. 2014) are concerned with the lack of an independent organisation. This organisation could present and manage data from the environmental and social impacts of the materials and processes. At present the material samples consist of information from the visual and tactile qualities as well as the data concerning technical properties (Gruendl et al. 2014). The authors present a theory that in the future, material samples will include information about the sustainability (e.g., raw-materials, process, sourcing). The theory continues to suggest that the designers may improve their design decisions based on the studied data from the sustainability of the materials (Gruendl et al. 2014).

A recurring trend and approach that arises is the field of biotechnology and biomaterials development is increasingly progressing (Openshaw, 2015). It seems there is space for optional methods such as, an advancement in the reformed generation of the colour, natural colorants, growing materials and the manufacturing processes throughout the explorations and studies. Designers studying and developing the biotechnology are *co-fabricating* with the nature (Kuitert 2015). The founder of the Biofabricate Susan Lee says in the interview with the *Frame* magazine (Openshaw 2015, 166):

*Interestingly, many of the early biomaterial companies have been founded not by scientists but by architects, designers and engineers and even artists.*

This direction will explore the solutions for the situation where our resources in this present moment are increasingly strained (Openshaw 2015, 166).

Referring to this study, the interest for sustainably produced products communicate that consumers are aware of this phenomena. These consumers are interested in the consciences for the environment when consuming a product. This creates the demand for the industry place the environment and the sustainability in their mind for the whole product design process.





5

# Conclusion

This chapter concludes the previous chapters and answers to the research questions based on the results of this study. This chapter presents limitations of the process as well as speculates the scope for possible further research directions. The last section of this chapter reflects the process of this study.

## 5.1.

# Conclusions

This thesis presents a study from the colour and materials design discipline in the product design industry. This study was conducted through ethnography, specialist interviews, and literature. The main objective for this study is to draw an understanding from the discipline and from the colour and material professionals who are practicing in the established companies. In this investigation the aim was to collect the data from the field.

The secondary aim of this thesis is to gain an understanding from the human-product relationship and from the colour and materials experience of the product. This thesis collected the background theory from literature which covers the human-product relationship and the role of the colour and materials in the product. This study presented briefly the collected theory from the literature.

The outcomes of the study will be presented in the following section.

How does the human experience the product in context of the colour and materials?

The human experience of the colour and materials is a broad field to cover. This thesis approached the area of the human experience by briefly investigating the human-product relationship. And by investigating appearance of the colour and materials in the product. The question of how the human experiences the product is broad and the background research conducted in this study is too narrow for concluding the outcomes.

However, the background literature presents a range of theories from the human-product relationship. Based on these theories this thesis found that the human perception of the product is subjective. Based on this conclusion, this thesis presents that every human has their individual experience from the products. The product provides an emotional experience and an aesthetic experience to the user. The product experience is based on the information of the human senses register, this can be conscious or unconscious. This interaction evaluates how the product engages and feeds ones senses.

The investigation from the professionals uncovered that the user experience, the colour and materials experience, and the human-product relationship have an impact on the discipline. This thesis suggests that the human-product relationship and the colour and materials experience of the product are likely to play a significant role in the future.

This current data collected highlights the importance of comprehending the theories from the human-product relationship. This thesis suggests that it would be beneficial for the designers to gain an understanding from this area and implement this knowledge to the product design process.

What is the colour and materials design in the product design industry and how do the professionals practice in the discipline?

This thesis presents an overview of the discipline and the practicing professionals, concluding that the colour and materials design is an established practise-led design discipline. One of the principals of the discipline is to create a coherent product experience through colour, materials, and finishes.

The current data from the field highlights that the core of the discipline is the combination of the artistic mindset, creative mindset and the practise-led design approach. Through this combination the professionals implement design solutions to the design strategy and portfolio whilst supporting the creative research and development, they also practice in the product design programmes.

This study has found that generally the discipline and the colour and materials designers practice in the horizontal position within a group of specialists internally and externally during the product design process. These findings show that the ability to perform seamlessly in parallel with multitude elements in collaboration within a team of professionals is fundamental for colour and materials design creation.

This study has identified that the colour and materials design may successfully fuel the product design process through the materials development. The successful implementation of the colour and materials design may be delivered from the beginning of the product design process.

The study shows that professionals practice with a range of creative practise-led methods, tools, and applications during the design process. These methods and tools are partly common design tools which are known in the field of product design

However, this investigation reveals that the discipline has its own methods. These methods are applied specifically for the creative exploration of materials and colour. The end-result of these creative explorations are colour and materials design tools, directions, colour and materials palettes, and effects. These applied creative methods of the discipline may vary based on the companies and professionals.

The findings of this research provide insights for future evolution of the discipline. The growing trend in sustainable materials and colour can be seen in the field of study. The result of this research supports the conclusion that digitalisation is affecting the the future of the discipline. The synthesis of the material and the immaterial creates a new experience of the colour and materials for the user.



## 5.2

# Limitations and future work

This thesis had a number of limitations which influenced to the outcomes of this study. Managing the content of this study within in the time frame. The strict confidential obligations of the professionals with their employer affected the interviews. The limitation of the confidentiality was considered prior to the surveys. This limitation also directed the thesis to a more general direction.

Further research could explore colour and materials design in depth. For the auto-ethnographer this field of study would be interesting to continue and study in more depth in the future. There are several interesting directions where the exploration could expand.

A future study could investigate the colour and materials experience with a holistic approach in the product design process. Another possibility could be to continue with the direction of the research of synthesis of the material and the immaterial experience of the product.

## 5.3

# Reflections

The process of this study drove me to confront an uncomfortable territory. I challenged myself during the process to operate with this project. The outcomes of challenging myself reflected an increase in my competencies on a professional level. I gained an additional understanding from the background theory from the human-product relationship and the colour and materials experience. This understanding will be beneficial for me when it is combined with my practical knowledge from colour and materials design on my return to the product design industry as a practicing colour and materials designer.

At this present moment as I reflect on this thesis and return to the beginning of this project, I have a few notions I would like to highlight from the process. In the beginning of this process I had certain a vision and aim. However, I did not quite understand the time it would consume to deliver.

Conducting a research based thesis was not familiar to me and during this process I felt at times to be insecure practicing with in the academic environment. Writing an academic english thesis was time consuming and consisted of a steep learning curve for me. These components also affected the time frame of this thesis.

I think the frame work of this thesis could of been more solid, despite the fact that I managed the calendar and planned a solid delivery timeline for this thesis. Still I feel the balance within the framing and the timescale could have been aligned slightly better.

The chosen number of the professionals participating this study served the purpose successfully. These interviews fulfilled the aim of the study by delivering a sufficient data from the field. The data received from the professionals and the observation from the participant were analysed and labelled to the themes. These analysed outcomes from the study were surprisingly aligned even though the designers are practicing in the diverse range of product industries.

Reflecting on chapter two the colour and materials experience as a topic has been conducted alone through the theoretical background of this study. The experience of the colour and materials is an area which I could of added to the interviews or inquired from the professionals subsequently.

I predict that the designers would have insights to share from the colour and materials experience. Based on their insights I could of merged the theoretical background and the research from the discipline to be more consistent. Reflecting on this knowledge, I feel that chapter two is slightly unfinished and narrow when compared to the other chapters. This chapter could of been conducted in a more successful way in this thesis.

Conversely this thesis was a learning process and I gained broad amount of knowledge from this process. During the process I evaluated my strengths and weaknesses conducting this type of a study. Despite the problematic issues of this thesis, I gained an understanding on how I would practice this process again in the future. This awareness has been made possible as a result of completing this thesis. Taken this together, I am satisfied that I delivered this study and collected the data from the colour and materials design.







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Figure 4. Sonneveld M. and Schifferstein, H. 2008. 'The Tactual Experience of the Objects', Schifferstein, H. and Hekkert, P. (ed.) *Product Experience*. Oxford: Elsevier Science. pp. 41- 67

Figure 5. Jutta Johansson

Photographs: Eeva Suorlahti

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Figure 1-5 illustration: *Annika Leppäaho*

Figure 1. Schifferstein, H. and Hekkert, P. 2008. *Product Experience*. Elsevier Science.

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# Appendix 0

## Specialist interview / Questions

**Name:**

**Title:**

**Company / Organisation:**

**Bio (shortly about you and your background/  
career) :**

### Personal – Favorites

1. What is your favourite colour & material?
2. Could you describe why those are your favourite ones?
3. What is your favourite ‘tool’ you use in your work?

### Role of a Colour and Materials design & designer

1. What is your role in the company and how do you position yourself in the field of CMD / CMF design?
2. What are your key assets / strengths as a CMD / CMF designer?
3. What type knowledge & skill set is needed in your work?
4. Are there some specific knowledge & skill set which CMD / CMF designers only have?
5. Where and how do you get the inspirations for your work?
6. Any thoughts how CMD / CMF could be taken to it's full potential in the different areas of business / companies / organisations?

### Colour and Materials Design – Creative Methods & Tools

1. What type of creative methods and tools you use in your work?
2. Which phase of colour and materials design process is your favourite one/ones? Why?
3. How do you study color, material & finishes?

### Future on the field of Colour and Materials

1. How do you see the role of CMD / CMF design evolving / changing in the future?
2. What type of knowledge & skill set will be needed in the future?
3. How important is the push for sustainability for CMD / CMF?

## Specialist interview of the method / Questions

**Name:**

Overview

Can you describe principles of the method?

Can you describe the goals of the method?

Method

Why method was created?

How method was created?

What was the method end result?

What are the key assets in method?

How long it took to develop this method? If possible please describe the timeline.

How method were implemented on portfolio level? How about product level?

Can you describe the tools method created to CMD process?

How method could develop in the future?

Fonts

*GT Sectra Fine and Display, Glacial Indifference*

Appendix 1 and 2: *GT Sectra, Futura*

Papers

*Munken Lynx 120g*

*Munken Pure 80g*

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